# ARTIFICIAL INTELLIGENCE FOR EFFECTIVE MODELING OF GROUNDWATER PLUMES BASED ON LIMITED GEOLOGICAL AND GEOPHYSICAL DATA

*Farag Mewafy, Oklahoma State University, Stillwater, OK, USA*
*Ahmed Ismail, Oklahoma State University, Stillwater, OK, USA*

Mapping groundwater plumes helps the remediation efforts, eliminates groundwater contamination, and protects public health. However, effective mapping of groundwater plumes requires extensive drilling and/or geophysical measurements, which is often quite costly. The main objective of this study is to test the Artificial Intelligence (AI) approach for providing a detailed cost-effective mapping of groundwater plumes based on limited geological and geophysical data. We implement the AI approach in this study to integrate sparse geophysical measurements with limited geologic and hydrologic information from a few available boreholes to map lateral extension and direction of movement of a hydrocarbon plume. Comparing the mapped lateral extension, thickness, and movement direction of the investigated plume from the AI approach with borehole measurements showed fairly reasonable agreement. This study shows that the AI approach can help generate a more comprehensive and cost-effective characterization of subsurface features in general and geo-environmental hazards in particular.